UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,391	01/29/2008	Seitaro Ohta	062658	7043

38834 7590 03/26/2010

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER	
PAUL, ANTONY M	

ART UNIT	PAPER NUMBER
2837	

NOTIFICATION DATE	DELIVERY MODE
03/26/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

Office Action Summary	Application No.	Applicant(s)	
	10/587,391	OHTA ET AL.	
	Examiner	Art Unit	
	ANTONY M. PAUL	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 thru 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3, 6 thru 11, 12/6 and 14* is/are rejected.

7)☒ Claim(s) *2,4,5,12/4, 12/5,12/15, 13 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 January 2008 and 23 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/27/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections – 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 7, 8, 9, 10, 11 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuruta et al. (5,696,672).

Claims:	**Tsuruta et al. teaching:**
Claim 1: A servo control apparatus for controlling a controlled object in response to a command, comprising:	a control apparatus (figs.10, 13, 16, 19-26) controls a controlled object 26 (servo motor, see fig. 10 & col. 7, lines 40-43) in response to a target instruction r (target position instruction for motor, see col. 8, lines 52-53), comprising:
a controller which receives a target command increment value which is an increment in a sampling period of a target command, and	a control portion such as the memory 22 receives the target instruction increment value Δr having associated sampling times (i+1, i+2,..), where r represents the target instruction (see col. 8, lines 52-53; target instruction increment provided by the instruction generator 21 to the control portion 22, see fig.10), and
sends a control input to the controlled object such that the target command which is an integrated value of the target command increment value becomes coincident with an output of the controlled object; and	a control input Δ u(i) is provided to the controlled object 26 and an integrator 29 integrates a deviation value Δ e(i), which is associated with a difference between the target command (from the instruction device 21) and an output value Δ y(i) (from the control object 26) and fig.10 shows the integrated value e (i) coincides with the output Δ y(i) from the controlled object 26

a compensation signal arithmetic unit which receives the target command increment value as an input,	in the arithmetic unit 25; and read on to the arithmetic unit 25, which receives the target command increment value Δr (i+1) (see fig.10) as an input
generates a compensation signal for decreasing an error of the target command and the output of the controlled object at the time of acceleration/deceleration, and sends the compensation signal to the controlled object.	read on to the arithmetic unit 25 generating a compensating signal such as an adjusted control input signal $\Delta u(i)$ to the controlled object (motor) 26 for minimizing the deviation error Δ e(i) associated with the difference between the target command Δr and the output Δ y(i) of the controlled object (motor) 26 at the time of the acceleration/deceleration such as read on to the speed of the controlled object (control object speed output coincides with the target speed instruction, see col. 24, lines 22-33 & fig. 19) (fig. 11 shows the target command, r, controlled object output y and the deviation error e, which is minimum compared to the deviation error e of the conventional system shown in fig.12; prior art teaches a deviation estimate becomes minimum so that the output of the controlled object coincides with the target object; see col. 2, lines 44-67).
Claim 7: The servo control apparatus as recited in claim 1, wherein the controller is a predictive controller which determines the control input such that	Predictive controller read on to any one of the control apparatus (figs. 10, 13, 16, 20, 24, 26) providing future deviation estimates, future target instructions and determines control input Δ u(i) for controlling a controlled object (motor),
an evaluation function on an error predicted value at a future time, an error, a control input, and a control input increment value becomes minimum.	Tsuruta et al. teaches making an evaluation function [J] having an error predicted value such as future deviation estimate e*(i+m) becomes a minimum (see equations 3-3 to 3-4, which includes an error e (i), error prediction value e*(i+m) and control input/ increment value Δu (i+1),… = 0, see col. 8, lines 1-62).
Claim 8: The servo control apparatus as recited in claim 1, wherein the controller is	Control apparatus (figs 10, 13, 16, 19-20) is a position controller (control object

a position controller which adjusts the control input so that the target command obtained by integrating the target command increment value becomes coincident with the output of the controlled object.	position output coincides with the target position instruction, see col. 24, lines 24-25) as it adjust the position y(i) of the controlled object (motor) 26 (using differentiator 27 and subtractor 28) and also feedback adjust the control input u(i) (using arithmetic unit 25) and an integrator 29 integrate a difference value Δe(i) associated with the target command Δr (i) (inputted via the subtractor 28), where the integrated value e(i), which is associated with the said target command value Δr (i) coincides with the controlled object output Δy(i) in the arithmetic unit 25 (target command increment value Δr (i+1) coincides with the controlled object output Δy(i) in the arithmetic unit 25, see fig. 10).
Claim 9: The servo control apparatus as recited in claim 1, wherein the controlled object includes a motor and a speed controller for controlling its speed, wherein the controller gives a speed command as a control input to the speed controller, and	Controlled object read on to the motor 63 and speed controller 62, where the speed controller 62 controls the speed of the motor 63 by providing a speed command v(i) as shown in figs. 19, 20 (alternatively controlled object read on to the motor 83 and speed controller 82, where the speed controller 82 controls the speed of the motor 83 by providing a speed command v(i) as shown in figs. 23, 24).
wherein the compensation signal arithmetic unit gives a feed-forward signal for compensating speed or torque as a compensation signal to the speed controller.	Read on to the arithmetic unit 74, which provides a speed feed back signal v(i), see figs. 19-20) and thereby provide an adjusted and/ calculated speed signal v(i) to the speed controller 62 (alternatively, arithmetic unit 95 provides a feedback signal Δv(i) and thereby provide an adjusted speed signal v(i) to the speed controller 82, see figs. 23, 24) (or fig. 36 teaches arithmetic unit 175 feedback torque control instruction u(i) via torque control portion 174 for providing an adjusted torque control input u(i) to the controlled object, see col. 26, lines 7-21, col. 29, lines 18-25).
Claim 10: The servo control apparatus as	Tsuruta et al. teaches torque control of a

recited in claim 1, wherein the controlled object includes a motor and a torque controller for controlling torque of the motor, wherein the controller gives a torque command to the torque controller as a control input, and wherein a compensation signal arithmetic unit gives a feed-forward signal for compensating torque as a compensation signal to the torque controller.	controlled object such as the motor using fig. 36, where arithmetic unit 175 feedback torque control instruction u(i) via torque control portion 174 for providing an adjusted torque control input u(i) to the torque controller, which controls the controlled object (see col. 26, lines 7-21, col. 29, lines 18-25).
Claim 11: The servo control apparatus as recited in claim 9 or 10, wherein the motor is a straight-moving type motor.	Read on to the servo motor (figs.10, 19, 23). Straight movement depends upon the application. Fig. 27 shows a fixed linear response of the controlled object (motor).
Claim 14: The servo control apparatus as recited in claim 8, wherein the position controller decides the control input by the target command obtained by integrating the target command increment value, any one of proportionality, integral and differential operation of an error with a position of the motor, or a combination thereof.	A control apparatus 101 (fig.26) determines the control input u(i) by inputting a target command r (i+M), where the error $\Delta e(i)$ is outputted in response to a difference between the target command increment portion $\Delta r(i)$ and the controlled object (motor) position output value $\Delta y(i)$, where the said error is integrated using an integrator 107, which output the integrated value e(i) to the arithmetic unit 105, which produce the said deciding control input u(i) for controlling the controlled object (motor).

3. Claims 1, 6, 8, 12/6 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by conventional prior art figs. 10 thru 13.

Claims:	**Conventional prior art figs. 10 thru 13.**
Claims 1, 6, 8, 12/6 (as claim 12 depend on 6), and 14:	Applicants' have provided figs. 10 thru 13 as prior arts (See the background teaching for detailed explanation of the prior arts in applicants' spec., pages 1 thru page 4). The limitations of claims 1, 6, 8, 12 and 14 are prior art as they read on to the teaching of applicants' admitted prior art figs. 10 thru 13.

Claim Rejections – 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being obvious over Tsuruta et al.

In regard to claim 3, Tsuruta et al. shows in fig.26 a servo control apparatus 101 performing arithmetic operation including a differentiator 106 differentiating the target command increment value r(i+M).

Tsuruta et al. do not mention a multiplier which multiplies an output of the differentiator by an adjustment gain.

A multiplier which multiplies an output of the differentiator by an adjustment gain is obvious in that the arithmetic unit of the control apparatus perform arithmetic calculation of the inputted differentiated target command increment value to produce an adjusted control input signal for controlling a controlled object such as the servo motor.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuruta et al. as applied to claim 1 and in view of applicants' conventional prior art figs. 12-13.

In regard to claim 6, Tsuruta et al. do not mention a phase adjuster which sends a signal in which a phase adjustment of the target command increment value is performed to the controller.

Applicants' admitted prior art figs. 12-13 shows a phase adjuster 104/105 in which a phase adjustment of the inputted command increment value, where the

adjusted signal (read on to the adjusted target command increment value or the compensated signal) is sent to a motor controller 3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the phase adjuster of prior art figs. 12-13 in the system of Tusuruta et al. because a signal is delayed using a phase adjustment parameter (see applicants' spec, page 3, lines 21-23) and a servo control apparatus with improved trackability can be realized (see spec. page 4, lines 8-10).

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuruta et al. as applied to claim 6, and in view of applicants' conventional prior art fig. 12.

In regard to claim 12, Tsuruta et al. do not mention the phase adjuster is any one of a low-pass filter, a high-pass filter, and a delay device for delaying a signal by a time specified by a phase adjustment parameter.

Applicants teach this as prior art (phase adjustor 104/105 is a low/high pass filter or delay device, see prior art fig. 12, spec., page 3, lines 5-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the phase adjustor of conventional prior art fig. 12 in the system of Tsuruta et al. because a signal is delayed using a phase adjustment parameter (see applicants' spec, page 3, lines 21-23) and a servo control apparatus with improved trackability can be realized (see spec. page 4, lines 8-10).

Allowable Subject Matter

8. Claims 2, 4, 5, 12/4 (as 12 depend on claim 4), 12/5 (as 12 depend on claim 5), 12/15 (as 12 depend on claim 15), 13 and 15 are objected to as being dependent upon

a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Information disclosure Statement

Examiner acknowledges the receipt of prior art documents including the international search report dated 07/27/2006.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTONY M. PAUL whose telephone number is (571)270-1608. The examiner can normally be reached on Mon - Fri, 7:30 to 5, Alt. Fri, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benson Walter can be reached on (571) 272-2227. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BENTSU RO/
Primary Examiner, Art Unit 2837

/Antony M Paul/
Examiner, Art Unit 2837

03/19/2010